

FIG. 1A (PRIOR ART)

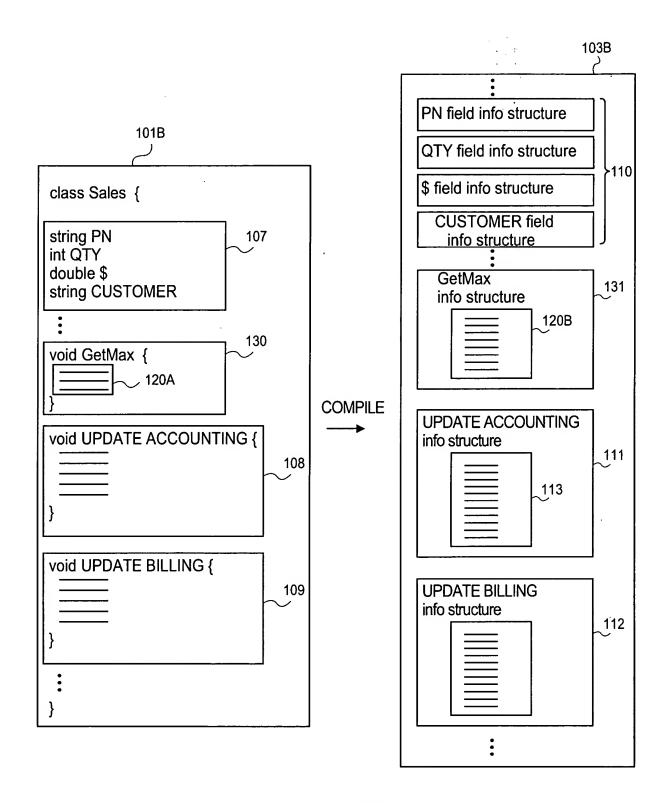


FIG. 1B (PRIOR ART)

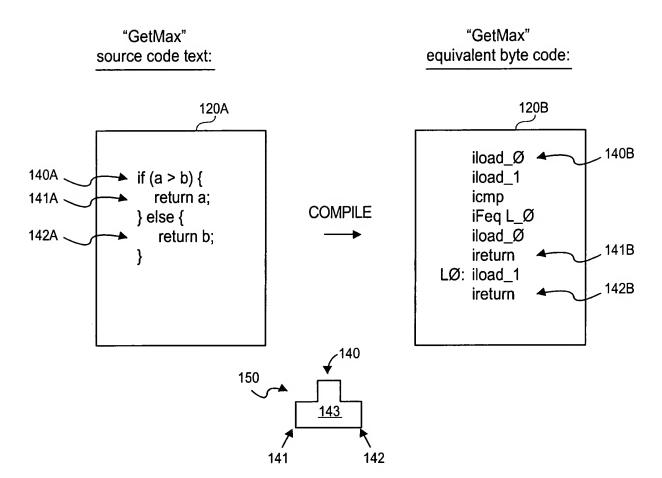


FIG. 1C (PRIOR ART)

ξ

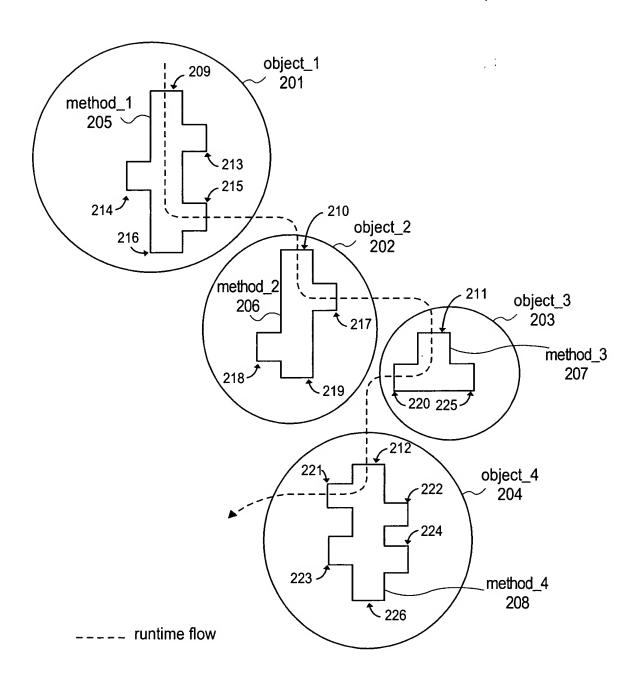
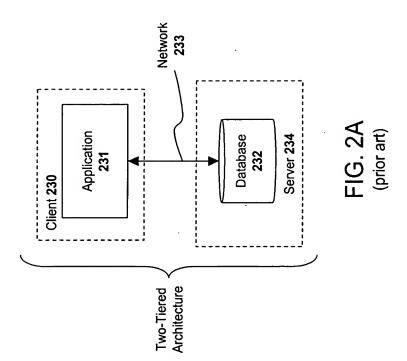
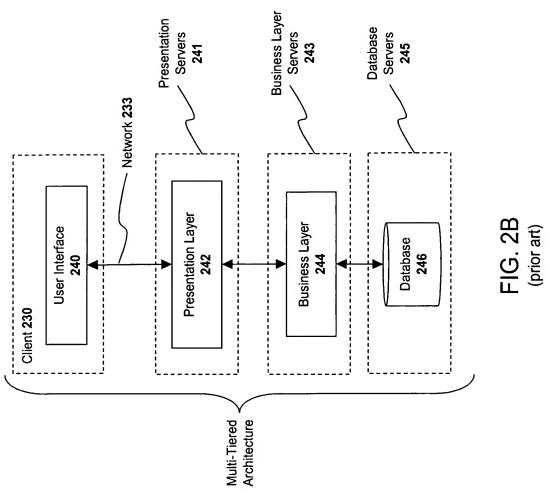


FIG. 1D (PRIOR ART)





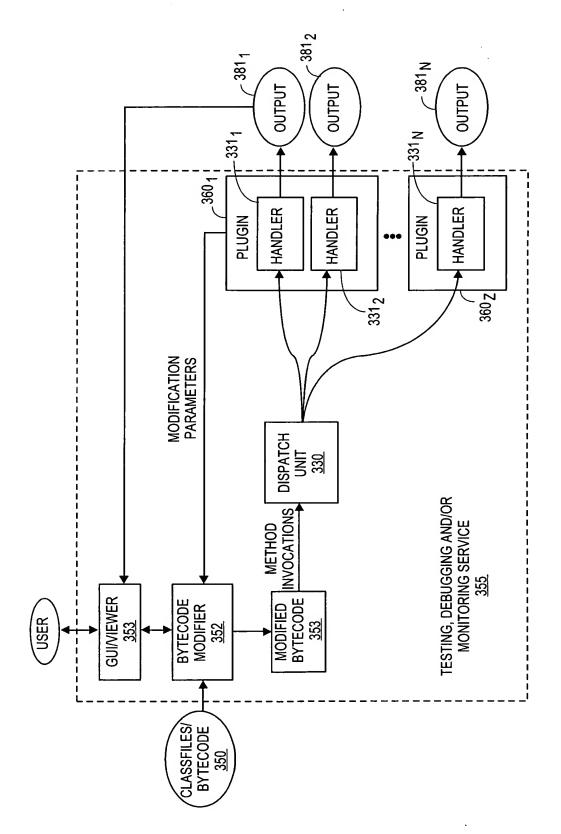


FIG. 3

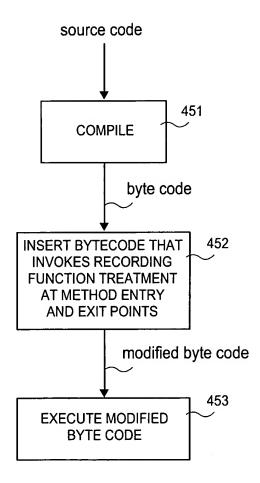
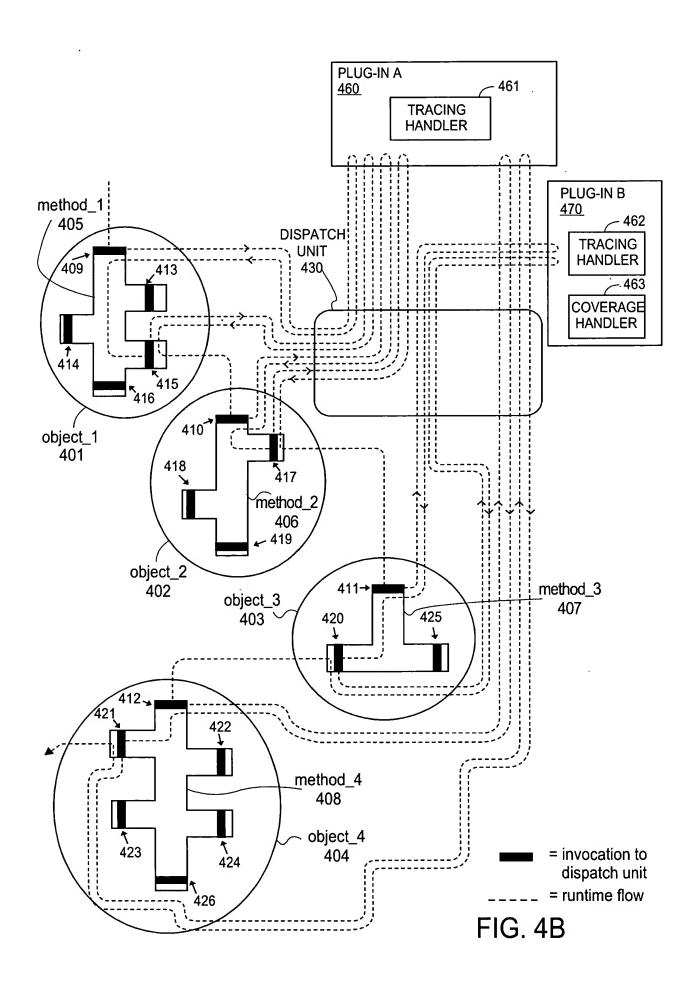
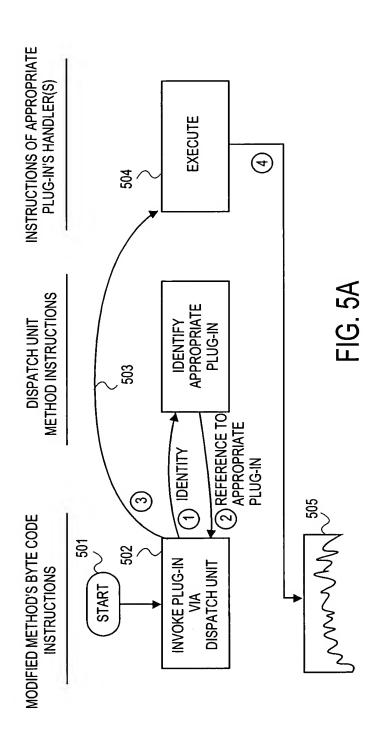
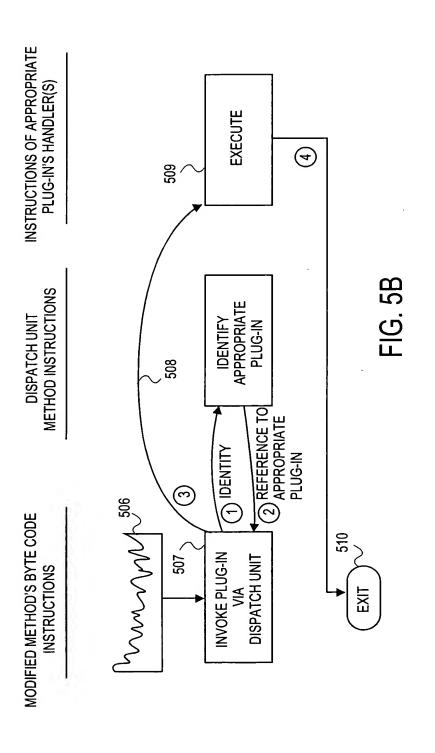
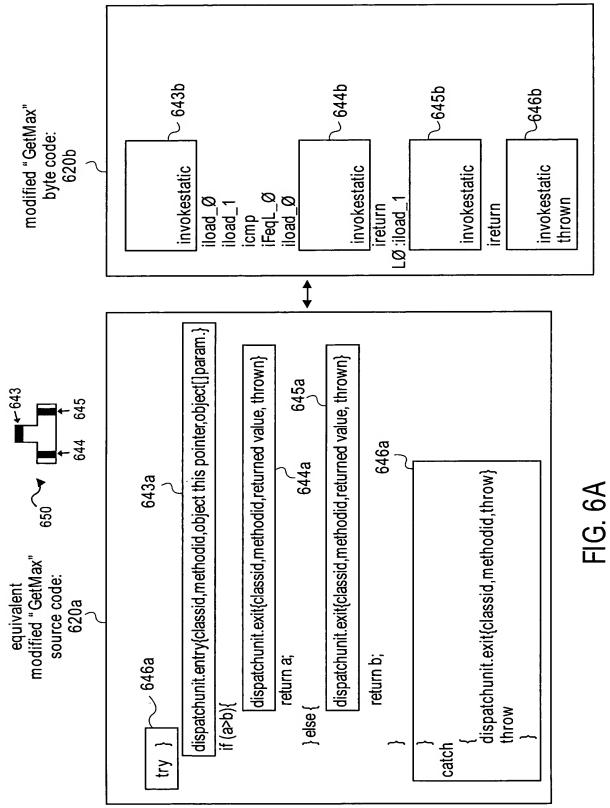


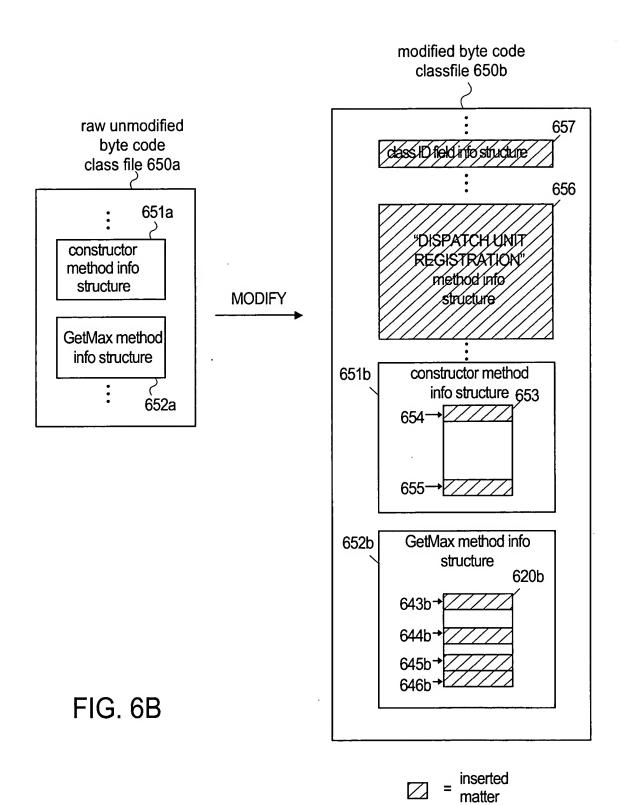
FIG. 4A











		701 ک
	INVOKING METHOD	PLUG IN MODULE
(method_1)	C ₁ , M ₁ , args ₁₁	PIM_A
(method_2)	C ₁ , M ₂ , args ₁₂	PIM_A
(method_3)	C ₂ , M ₁ , args ₂₁	PIM_B
(method_4)	C ₃ , M ₁ , args ₃₁	PIM_A

FIG. 7

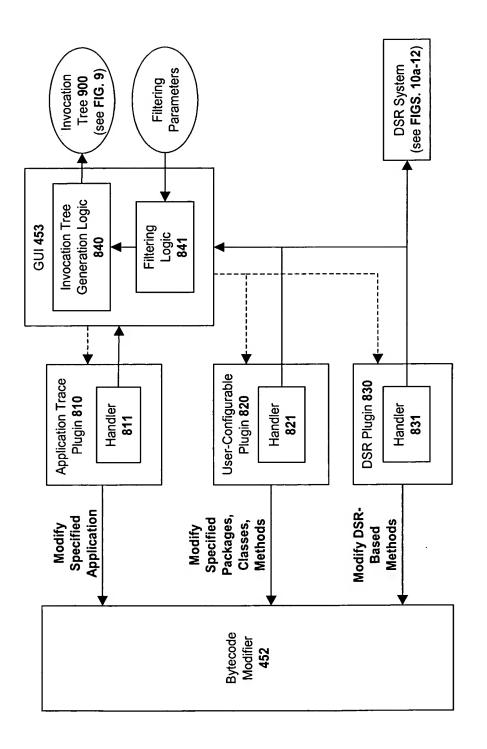
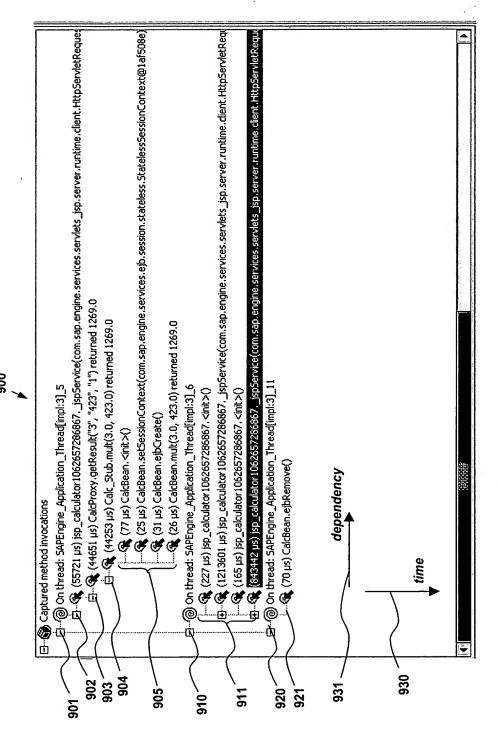


FIG. 8



Invocation Tree

FIG. 9A

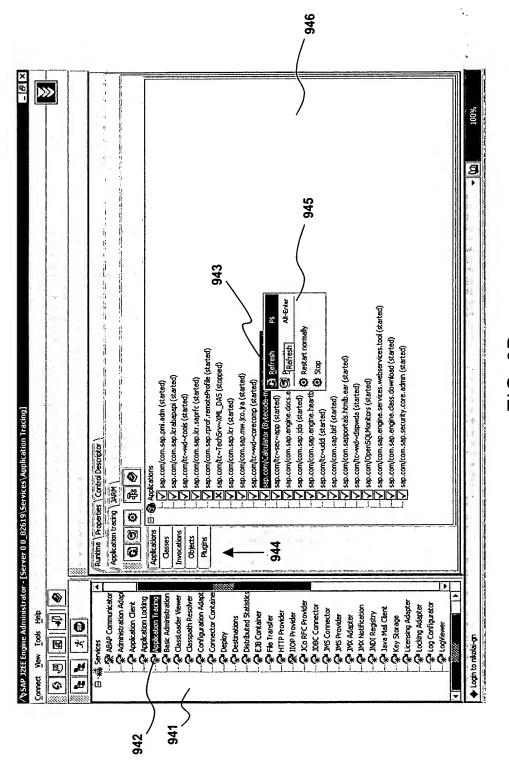


FIG. 9B

FIG. 9C

FIG. 9D

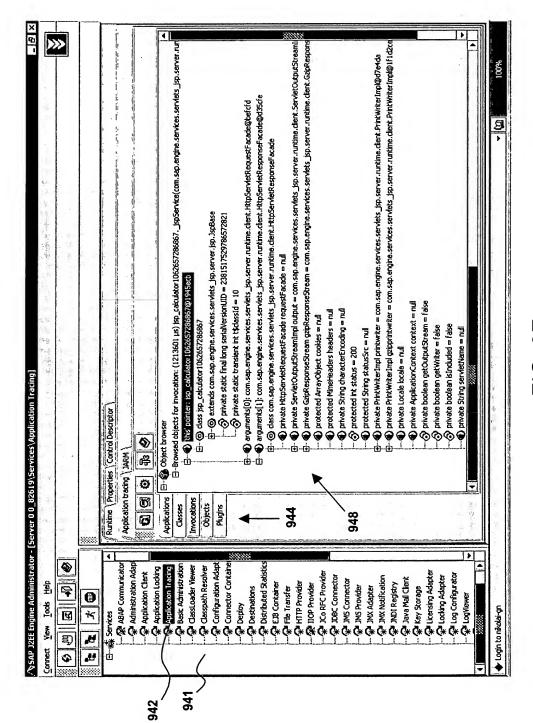
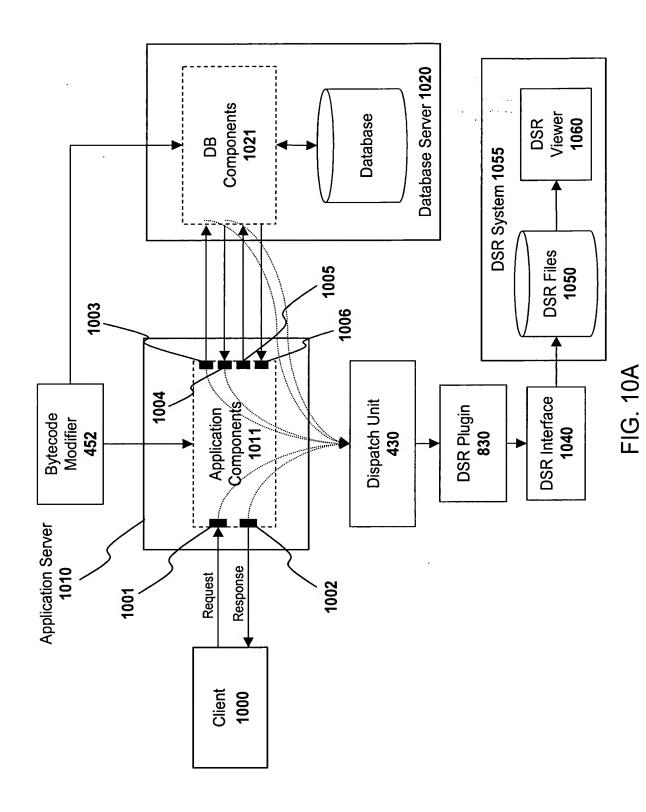


FIG. 9E



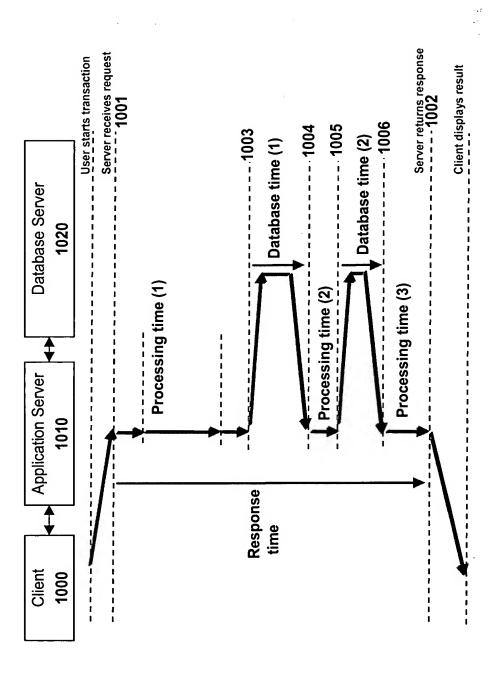


FIG. 10B

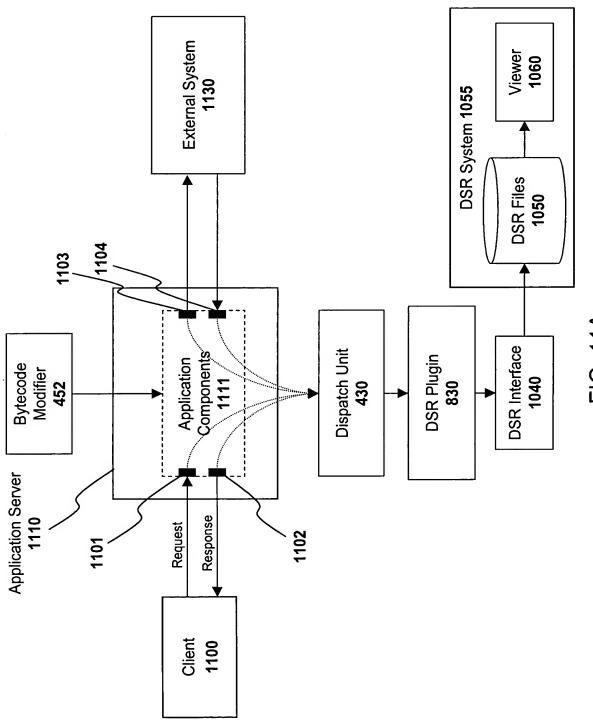


FIG. 11A

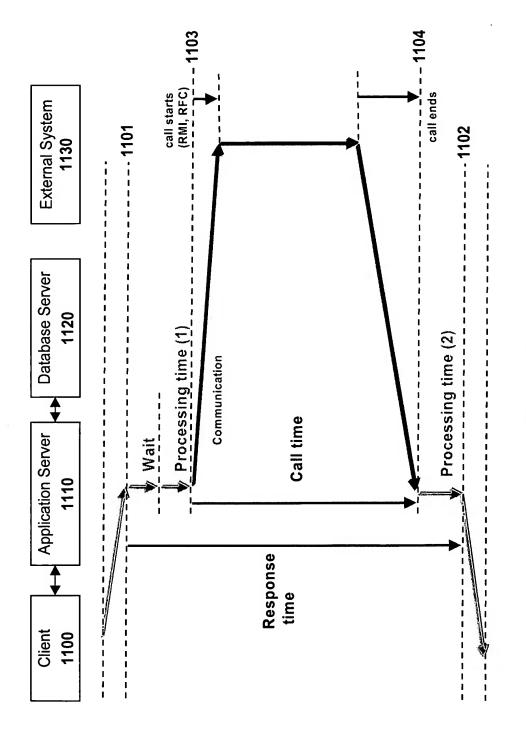


FIG. 11B

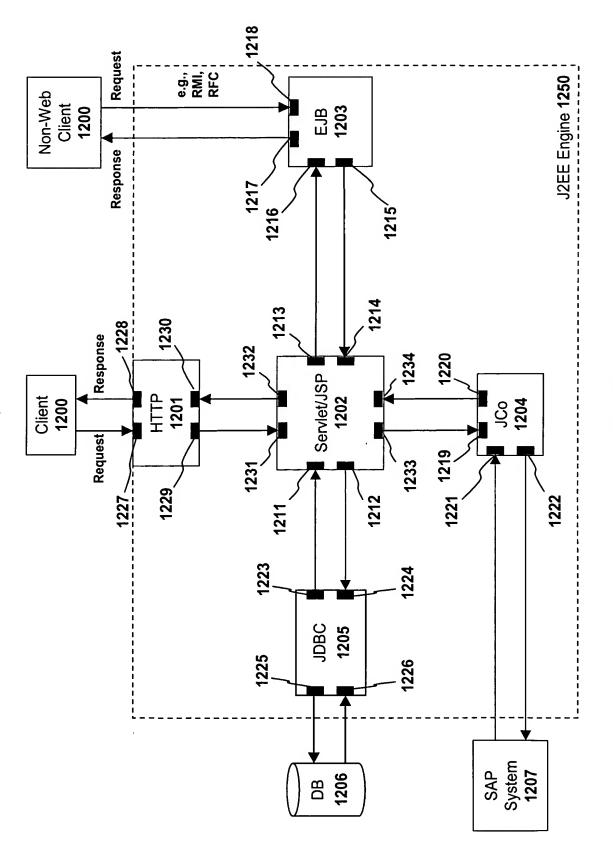


FIG. 12

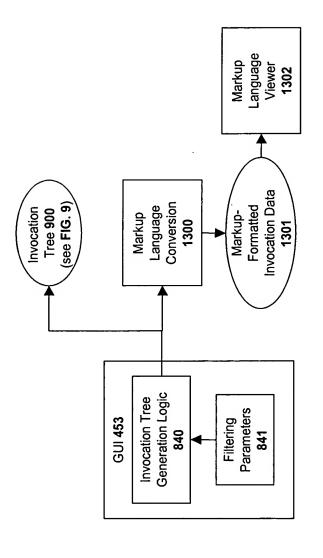


FIG. 13

FOR EACH CLASSFILE HAVING A METHOD TO BE MODIFIED:

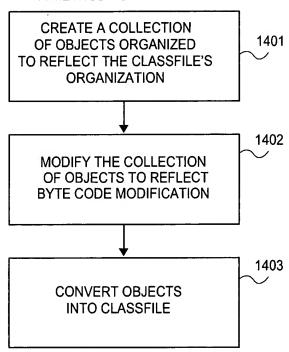
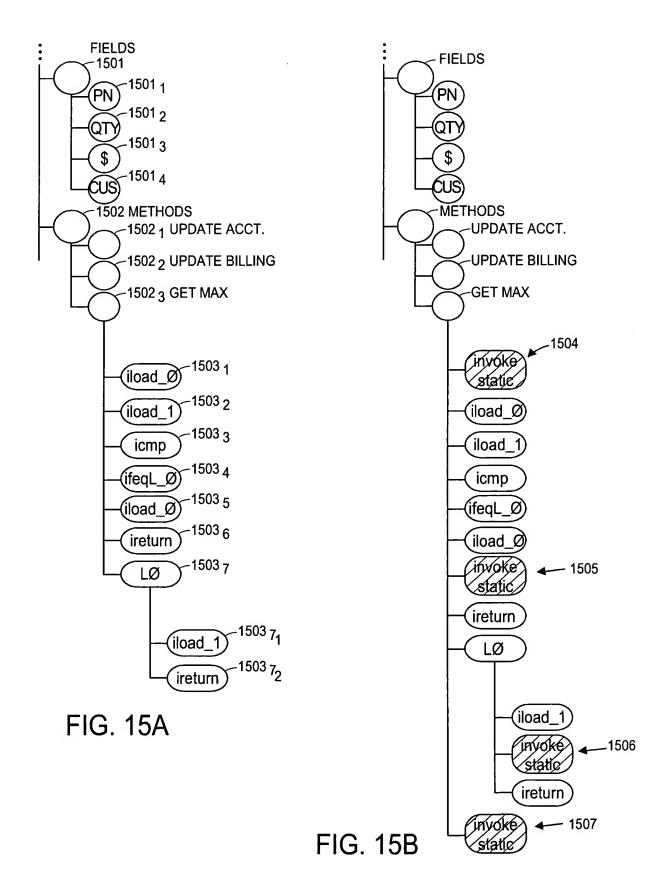


FIG. 14



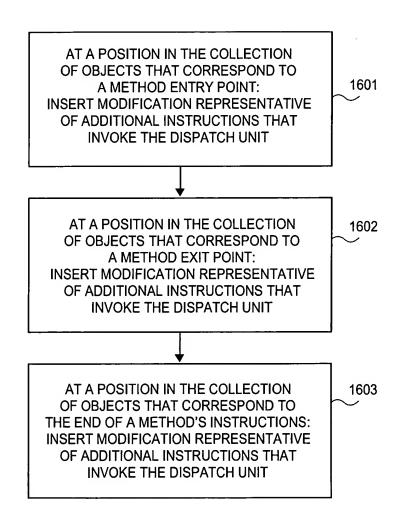
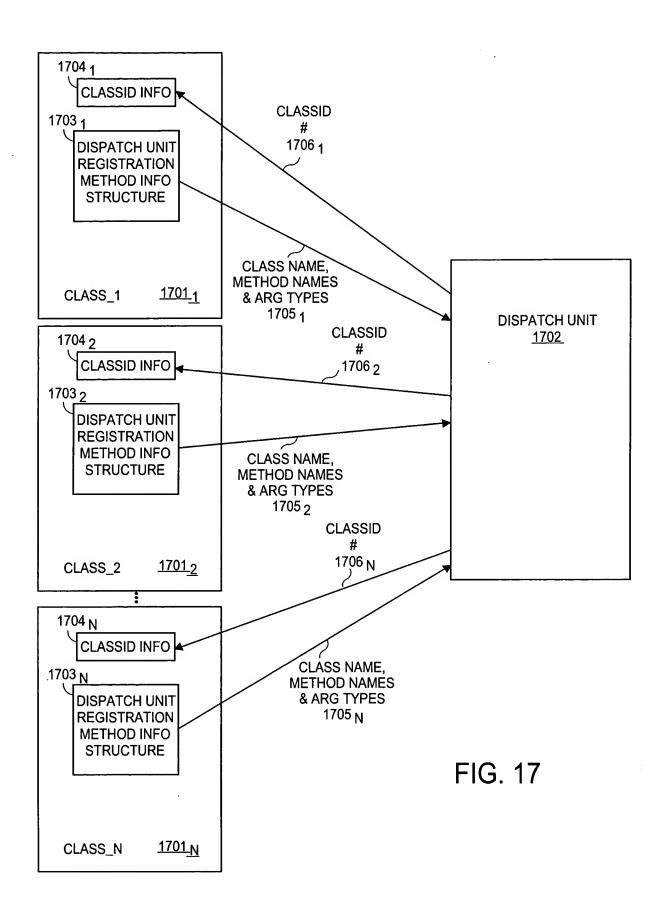


FIG. 16



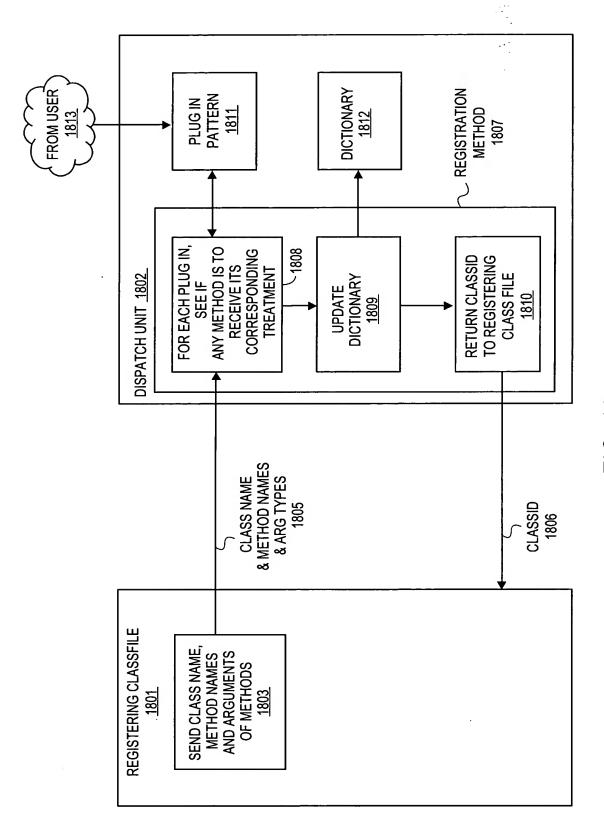


FIG. 18

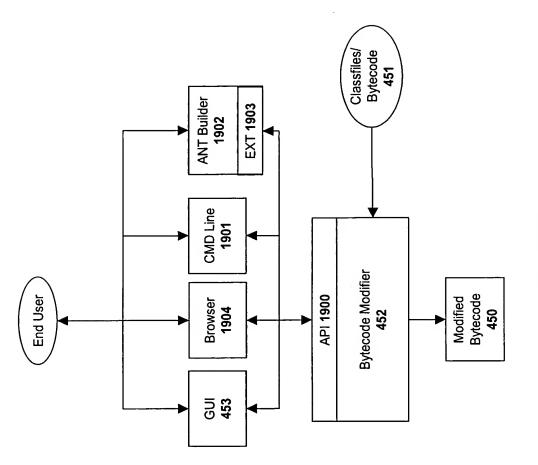


FIG. 19A

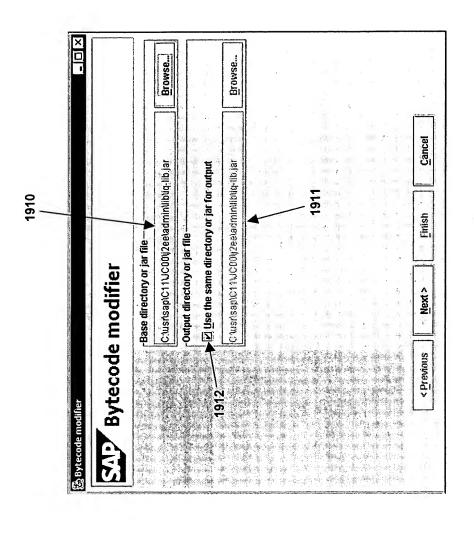


FIG. 19B.

1921

FIG. 19C

1922

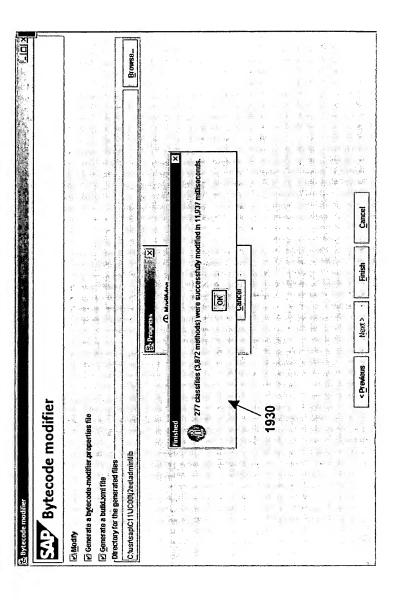
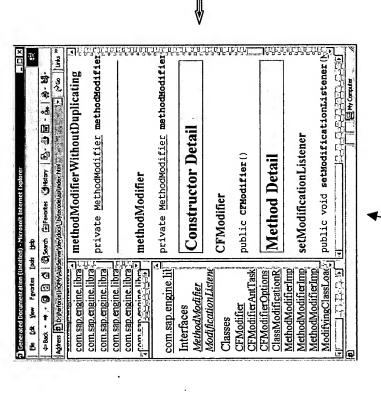


FIG. 19D



// Direct modification of a file
CFModifier modifier = new CFModifier();
modifier.modify("D:/temp/A.class", null);

// Modification in a classloader
Class defineModifiedClass(byte[] data) {
 CFModifier modifier = new CFModifier();
 byte[] data1 = modifier.modify(data);
 return defineClass(data1);
}

FIG.

940

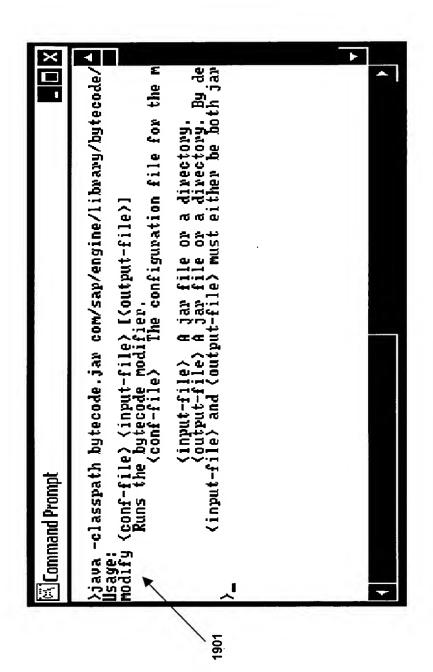


FIG. 19F

<taskdef name="modify"</pre>

classname="com.sap.engine.library.bytecode.modifier.ModifierTask"

classpath="bytecode.jar"/>

ANT Builder 1902

EXT 1903

<modify conf="bytecode-modifier.properties"</pre>

inputFile="D:\temp\classes" outputFile="D:\temp\classes1"

check="true" verbosity="2" failonerror="true"/>

1950

FIG. 19G